INDEX.

PAGE

Abbott, G., M.R.C.S.—
Letter on; "Deserts and their Inhabitants" 136

Acetylene Gas—
Note on 254

Africa and its Animals—
By R. Lydekker 137

Agriculture, A Classic Legacy of—
By John Mills 140, 148

Alexander, Boyd, M.B.O.U.—
A Valley on São Nicolau, Cape Verde Islands 100

Ant, The Gizzard of the—
By Walter Wesché 259

Antarctic Exploration—
Note on... 275

Antlers, Ancient Red Deer—
By R. Lydekker 43

Aurora Borealis, The—
Letter on; by J. M'R. 229

Aurora, Photographic Spectrum of the—
By Edward C. Pickering 134

Aurora, The Great Sunspot and the—
By E. W. Maunder 228

Australasia, Vegetation of
Letter on; by Fred Whitteron 33

Battersby, Frances I.—
An Irish Superstition 256

Bee, The Hooks on the Mandible of the Honey—
By Walter Wesché 259

Bees, British, I., II., and III.—
By Fred. Enock 50, 82, 97

Bees' Mandibles, Hooked Process on—
Letter on; by Walter Wesché 183

Beet Sugar, The, Industry in England—
By John Mills 241
Letter on; by Sigmund Stein 277

Besley, W. E.—
Letter on Variable Stars 81

Bessemer, Sir Henry—
Obituary Notice of 80

PAGE

Binary, A New Spectroscopic—
By Edward C. Pickering 134

Birds, Rare—
Letter on; by W. H. S. Monck 17

Bird-Song, Repetition and Evolution in—
By Charles A. Witchell 196
Letter on; by W. Alfred Parr 277

Books, Reviews of—

Andrée and his Balloon. By Henri Lachambre and Alexis Machuron 87
Animals, Wild Traits in Tame. By Louis Robinson 64
Astronomy, a New, for Beginners. By David P. Todd 109
Astronomy, Elements of Descriptive. By Herbert A. Howe 233
Astronomy, The Concise Knowledge. By Agnes M. Clerke, A. Fowler, and J. Ellard Gore 111
Astronomy, The Elements of. By Charles A. Young 65
Audubon and his Journals. By Maria R. Audubon 231
Birds in London. By W. H. Hudson 208
Bond, William Cranch, and his son, George Phillips Bond, Memorials of. By Edward S. Holden ... 134
Botany, a Text-Book of. By Dr. E. Strasburger, and others 209
Carpentry and Joinery, Notes on. By Thomas Jay Evans 86
Chemistry, a Treatise on (Vol. II. The Metals.). By Sir Henry Roscoe and C. Schorlemmer ... 85
Chemistry, Text-Book of Physical. By Clarence L. Speyers 180
Darwin, The Method of. By Frank Cramer ... 20
Democracy, The Rise of. By J. Holland Rose ... 19
Design for Woven Fabrics, Ornamental. By C. Stephenson and F. Suddards 19
Eclipses, Recent and Coming. By Sir Norman Lockyer 20
Education, English National. By H. Holman ... 273
Electricity in the Service of Man. By R. Wormell 20
Electro-Physiology, Vol. II. By W. Biedermann 179
Entomology, Text-Book of. By Alpheus S. Packard 256
Ethnological Studies among the North-West Central Queensland Aborigines. By Walter E. Roth ... 180
Flora of Perthshire, The. By Francis Buchanan W. White 157
Fowling, a History of. By Rev. H. A. Macpherson 110
Geology, an Introduction to. By Wm. B. Scott... 20
Geology for Beginners. By W. W. Watts ... 273
Greece, The First Philosophers of. By Arthur Fairbanks 157
Gutta-Percha, Cantor Lectures on. By Dr. Eugene Obach 232
Hunter, John: Man of Science and Surgeon. By Stephen Paget 20
Hypnotism, The Elements of. By Ralph Harry Vincent 86
Jaeger, Gustave, M.D., Researches and Discoveries by: Problems of Nature 38
Life, What is? By Frederick Hovenden ... 110
Light, Visible and Invisible. By Silvanus P. Thompson 37
Magnetism and Electricity, a Treatise on. By Prof. Andrew Gray 135

683991

PAGE

Books, Reviews of—

Mammals, Reptiles and Fishes of Essex, The. By Henry Laver 256
Mechanics, Applied. By John Perry 87
Mechanics, Theoretical. By A. E. H. Love ... 157
Memory and its Cultivation. By F. W. Edridge-Green 135
Montaigne and Shakespeare. By John M. Robertson 65
Moon, William, and his Work for the Blind. By John Rutherford 180
Museums and other subjects connected with Natural History, Essays on. By Sir William Henry Flower 232
Natural Causes and Supernatural Seemings. By Henry Maudsley 64
Natural History (Vertebrates) of the British Islands, A Sketch of the. By F. G. Aflalo 207
Naturalist's Directory, The 87
Nature and a Camera, With. By Richard Kearton 18
Nature, Some Unrecognized Laws of. By Ignatius Singer and Lewis H. Berins 88
Palæontology, Outlines of Vertebrate, for Students of Zoology. By A. Smith Woodward 273
Paré, Ambroise, and his Times. By Stephen Paget 135
Peary near the Pole, With. By Eivind Astrup ... 232
Photography, Krömscöp Colour. By Frederic Ives 272
Plant Life, Glimpses into. By Mrs. Brightwen ... 86
Psychical Research, Studies in. By Frank Podmore 37
Psychology, The New. By Dr. E. W. Scripture ... 63
Reliquary and Illustrated Archæologist, The. Volume for 1897 38
Roadside and River, By. By H. Mead Briggs ... 64
Smithsonian Institution, 1846-1896; the History of its First Half-Century. Edited by George Brown Good 134
Sport, The Encyclopædia of. By the Earl of Suffolk and Berkshire, Hedley Peek, and F. G. Aflalo ... 87
Starland, Stories of. By Mary Proctor 272
Studio, The 273
Sun's Place in Nature, The. By Sir Norman Lockyer 110
Thermo-Geographical Studies. By C. L. Madsen 156
Vertebrata, A Classification of. By Hans Gadow... 272
Vertebrates, Elements of the Comparative Anatomy of. By Dr. Robert Wiederscheim 88
Weltgebaude, Das: a Popular Treatise on the Heavens. By Dr. M. Wilhelm Meyer ... 208
White, The Journals of Walter 87
Wonderful Century, The; its Successes and its Failures. By Alfred Russell Wallace 232
Zoology, A Student's Text-Book of. By Adam Sedgwick 157
Zoology, Text-Book of. By H. G. Wells ... 257

Books and Periodicals, Short Notices of—

Architecture, Modern. By H. Heathcote Statham... 135
Astronomy for the Young. By W. T. Lynn ... 257
Astronomy, Observational. By Arthur Mee ... 88
Atoms in Space, The Arrangement of. By J. H. Van't Hoff 180
Bacteria—The Story of Germ Life. By H. W. Conn 38
Barometrical Determination of Heights. By F. J. B. Cordeiro 233
Biology, Scientific Method in. By Dr. Elizabeth Blackwell 233
Birds, Ackworth. By W. B. Arundel 274
Birds, The, of Montreal. By E. D. Wintle ... 274
Botany, Elementary. By Percy Groom 135
British Columbia, Year-Book of. By R. E. Gosnell 180
Carpentry and Joinery. By F. C. Webber... 274

PAGE

Centuries, The 135
Chemical and Physical Calculations, Reform of. By C. J. T. Hanssen 38
Chemistry, Elementary. By T. A. Cheetham ... 233
Chemistry, First Year's Course of Experimental Work in. By Ernest H. Cook 88
Chemistry for Photographers. By C. F. Townsend 65
Coinage, Story of the British. By Gertrude Burford Rawlings 111
Comets, Remarkable. By W. T. Lynn 111
Creation, The Process of, Discovered. By James Dunbar 257
Earth's History, Outlines of the. By N. S. Thaler 274
Electricity, Industrial. Edited by A. G. Elliott ... 233
Fern World, The. By F. G. Heath... 274
French Self-Taught. By C. A. Thimm 157
Geology, Applied. By J. V. Elsden... 274
Insects, Life-Histories of American. By Clarence Moores Weed 181
Intellect, The Building of the. By Douglas M. Gane 136
Laboratory Arts, On. By Richard Threlfall ... 209
London, Guide to. By Emily Constance Cook ... 136
Machinery of the Universe, The. By A. E. Dolbear 65
Magnetism and Electricity. By Dr. R. H. Jude ... 233
Mind, The Unconscious. By A. T. Schofield ... 274
Miner's Arithmetic and Mensuration, The. By Henry Davies 157
Nature Studies in Elementary Schools. By Mrs. Lucy Wilson 181
Observations, Notes on. By Sidney Lupton ... 233
Organic Chemical Manipulation. By J. T. Hewitt 88
Photographic Lens, A Simple Guide to the Choice of a. By T. R. Dallmeyer 209
Photography, The Story of. By Alfred T. Story ... 209
Physics, Elementary, Practical and Theoretical. By John G. Kerr 111
Physiography for Advanced Students. By A. T. Simmons 111
Physiology, Practical. By Alfred F. Blaisdell ... 38
Pictorial Instruction Object Lessons. By G. Colomb 65
Planisphere, Revolving 65
Plant-Life, Studies in. By Eleanor Hughes-Gibb... 257
Poultry for the Table and Market. By W. B. Tegetmeier 273
Process Year-Book for 1898 157
Radiography. By R. T. Bottone 274
Radiography, Practical. By A. W. Isenthal and H. Snowden Ward 233
Science, Elementary General. By A. T. Simmons and L. M. Jones 233
Science, General Elementary. Edited by Wm. Briggs 209
Science, What is? By the Duke of Argyll ... 257
Scientific Knowledge, First Year of. By Paul Bert 88
Seas, The Story of Life in the. By Stephen J. Hickson 209 209
Sun, The Study of the. By George Mackenzie Knight 111
Telegraphy, Wireless. By Richard Kerr ... 257

Botanical Studies—

By A. Vaughan Jennings

I. Vaucheria 21
II. Coleochæte 54
III. Jungermannia 115
IV. Mnium 163
V. Asplenium 211

PAGE

Botanical Studies *(continued)*—
By A. Vaughan Jennings.
VI. Selaginella 259
VII. Abies 282
VIII. Lilium 284

Botany, Economic—
By John R. Jackson ... 28, 73, 126, 199, 235

"Canterbury Tales," The Astronomy of the—
By E. Walter Maunder 205
Letter on; by H. J. Lowe 278

Carr-Gregg, Ivo F. H.—
Letter on The Urania Sternwarte 35

Celebes: A Problem in Distribution—
By R. Lydekker 175

Chess Column—
By C. D. Locock ... 23, 47, 71, 95, 119, 143, 167, 191, 215, 239, 263, 287

Clarke, Latimer, F.R.S.—
Obituary Notice of 276

Clerke, Miss Agnes M.—
Variable Stars in Globular Clusters 279

Cloud Belts—
By Wm. Shackleton 56

Cock, W. H.—
Letter on Dissociation of the Elements ... 35

Cole, Grenville A. J., M.R.I.A., F.G.S.—
The Floor of a Continent 25
The Structure of Ireland 74
The Mourne Mountains 121
An Old-World Highland 170
An Esker in the Plain 217
Volcanoes of the North 266

Comets and Meteors, Notes on—
By W. F. Denning 10, 46, 70, 94, 118, 142, 166, 189, 213, 237, 262, 285

Continent, A Drowned—
By R. Lydekker 3

Continent, The Floor of a—
By Grenville A. J. Cole 25

Cowries, The Colours of—
By R. Lydekker 270

Crommelin, A. C. D.—
The New Planet DQ 250

Crypton—
Note on 160

Cygni, Herschel V 37, Photograph of the Nebulous Region Round—
By Isaac Roberts 253

PAGE

Denning, W. F., F.R.A.S.—
Notes on Comets and Meteors 10, 46, 70, 94, 118, 142, 166, 189, 213, 237, 262, 285
Letter on Mercury 136

Deserts and their Inhabitants—
By R. Lydekker 101
Letter on; by G. Abbott 136

Draper Catalogue, The—
Letter on; by W. H. S. Monck 60

Earth, The Smell of—
By G. Clarke Nuttall 257
Letter on; by G. B. Longstaff 277

East, Rev. Arthur—
The Level of Sunspots 89
Artificial Faculæ 183
Letter on Photographing through a Fly's Eye 203
Letter on a Theory of Refraction in Sunspots 204

Easton, C.—
Richard Proctor's Theory of the Universe ... 12
A New Theory of the Milky Way 57

Eclipse, Moon in—
By L. Paxton 40

Eclipse, The Prismatic Camera at the Recent—
By J. Evershed 130

Eclipse, The Recent—
By E. Walter Maunder 107, 155

Eclipse, Total Solar, January 22nd, 1898 ... 38

Eclipse, Total Solar, January 22nd, 1898—
By E. Walter Maunder 49

Eclipses of the Moon, Errata in Times of—
Letter on; by Lewis Hensley 61

Eclipses, Total, The Prismatic Camera during—
By Wm. Shackleton 9

Editorial 265

Egg Collecting in its Relation to Science—
Letter on; by Joseph P. Nunn 34

Elements, Dissociation of—
Letter on; by W. H. Cock 35

Enock, Fred, F.L.S., F.E.S.—
British Bees—I. 50
British Bees—II. 82
British Bees—III. 97
Insect Miners 178, 209

Esker in the Plain, An—
By Grenville A. J. Cole 217

Ethnology at the British Museum—
By R. Lydekker 223

XUM

PAGE

Evershed, J., F.R.A.S.—
The Prismatic Camera at the Recent Eclipse 130

Faculæ, Artificial—
By Rev. Arthur East... 183

Fishes, Marine Food, Life Histories of the British—
Letter on; by A. T. Masterman 16

Flanery, David—
Letter on Variable Stars 60
Letter on Variable Stars 81
Letter on U Orionis and S and V Coronæ ... 203

Flowers, The Affinities of—
By Felix Oswald 222

Fluorine, Liquid—
By C. F. Townsend 31
Letter on; by S. H. Wright 61

Fly's Eye, How to Photograph through a—
By Fred. W. Saxby 187

Fly's Eye, Photographing through a—
Letter on; by Arthur East 203

Fowler, A., F.R.A.S.—
The Face of the Sky 167, 191, 214, 238, 263, 286

Gore, J. E., F.R.A.S.—
The Masses and Distances of Binary Stars... 62

Graham, A.—
Letter on Testing Multiplication and Division 17

Green, Jos. F.—
Letter on Weasel and Young 278

Grubb, J. Ernest—
Letter on A Brilliant Meteor... 35

Haddy, Thos. J.—
Letter on Artificial Sunspots... 17

Hall, Maxwell—
Letter on The Great Sunspot 279

Hensley, Lewis—
Letter on Errata in Times of Eclipses of the Moon 61

Holloway, George T., Assoc. R.C.S.Lond., F.I.C.—
The Petroleum Industry ... 124, 151, 169

Holmes, C. B.—
Letter on Mercury 114

Holmes, Edwin—
Letter on The Masses and Distances of the Binary Stars 136

Hydrogen Line, A Variable Bright—
By Edward C. Pickering 134

PAGE

Hydrogen, Liquefying—
Note on 137

Insect Miners—
By Fred. Enock 178, 209

Ireland, The Structure of—
By Grenville A. J. Cole 74

Jackson, John R., A.L.S.—
Economic Botany 28, 73, 126, 199, 235

Jeffery, H. G.—
Letter on The British Trap-door Spider ... 35

Jenkinson, J. H.—
Letter on Sunspots 181

Jennings, A. Vaughan, F.L.S., F.G.S.—
Botanical Studies—
I. Vaucheria 21
II. Coleochæte 54
III. Jungermannia 115
IV. Mnium 163
V. Asplenium 211
VI. Selaginella 259
VII. Abies 282
VIII. Lilium 284

Jervis, Lionel—
Serpents and how to recognize them... ... 7
The Evolution of the Venom-fang 91

Karkinokosm, The, or World of Crustacea—
By Rev. T. R. R. Stebbing 1, 67, 104, 145, 197, 243

Laboratory, Handicraft in the 249

Lagerwey, H. W. M., LL.D.—
Letter on The "Quagga" 203

Leigh, M. Cordelia—
Letter on Moon's Halo 278

Locock, C. D., B.A.—
Chess Column ... 23, 47, 71, 95, 119, 143, 167, 191, 215, 239, 263, 287

Longstaff, G. B.—
Letter on The Smell of Earth 277

Lowe, H. J.—
Letter on Astronomy of the "Canterbury Tales" 278

Lydekker, R., B.A., F.R.S.—
A Drowned Continent... 3
Ancient Red Deer Antlers 43
The Sea-Otter and its Extermination ... 78
Deserts and their Inhabitants 101
Africa and its Animals 137
Celebes: a Problem in Distribution 175
Whale Models at the Natural History Museum 193
Ethnology at the British Museum 223
The Colours of Cowries 270

PAGE

MacDowall, Alex. B., M.A.—
Is Weather affected by the Moon? 5
Weather Accounts 128
Sunspots and Life 234

Markwick, Lieut.-Col. E. E., F.R.A.S.—
On the Eclipse Theory of Variable Stars ... 153
Letter on the Eclipse Theory of Variable Stars 253

Masterman, A. T.—
Letter on the Life-Histories of the British Marine Food-Fishes 16

Maunder, E. Walter, F.R.A.S.—
The Spectra of Bright Stars 40
The Total Solar Eclipse, January 22nd, 1898 49
The Recent Eclipse 107
The Objective Prism, the Flash, and the Reversing Layer 184
The Astronomy of the "Canterbury Tales" ... 205
The Great Sunspot and the Aurora 228

Medals, Geological Society's—
Note on 37

Medals, Royal Geographical Society's—
Note on 137

Mee, Arthur, F.R.A.S.—
In the Moon's Northern Regions 84

Mental Fatigue—
Note on 204

Mercury—
Letter on; by C. B. Holmes 114
Letter on; by W. F. Denning 136

Messier 33 Trianguli, Photograph of the Spiral Nebula—
By Isaac Roberts 39

Metals, Smell of—
Note on 276

Meteor, A Brilliant—
Letter on; by J. Ernest Grubb 35
Letter on; by G. Northover Stretton ... 114

Meteors, The November 252

Milky Way, A New Theory of the—
By C. Easton 57

Mills, John—
A Classic Legacy of Agriculture ... 140, 148
The Beet-Sugar Industry in England ... 241

Mitchell, C. Ainsworth, B.A., F.I.C.—
The Vinegar Eel 53
The Vinegar Fly and the Vinegar Mite ... 139

PAGE

Monck, W. H. S.—
Letter on Rare Birds 17
Letter on the Draper Catalogue 60
Letter on the Sun's Stellar Magnitude ... 159
Letter on the Eclipse Theory of Variable Stars 182
Letter on Variable Stars 279

Monium—
Note on 230

Moon's Halo—
Letter on; by M. Cordelia Leigh 278

Moon's Northern Regions, In the—
By Arthur Mee 84

More, Alexander Goodman, Life of—
Review of 187

Morley, George—
Christmas Customs of Shakespeare's Greenwood 268

Mourne Mountains, The
By Grenville A. J. Cole 121

Mudflats, From a Hole in the
By Harry F. Witherby 29

Multiplication and Division, Testing—
Letter on; by A. Graham 17

Museum, South Kensington—
Notes on 16, 204

Nature's Finer Forces—
By H. Snowden Ward 114

Nebula and Region Round γ Cassiopeiæ—
By Isaac Roberts 106

Northampton Institute, Clerkenwell—
Note on 112

Notornis Mantelli
Note on 254

Nunn, Joseph P.—
Letter on Egg Collecting in its relation to Science 34

Nuttall, G. Clarke. B.Sc.—
"The Mimic Fires of Ocean" 150
The Smell of Earth 257

Occultation of 26 Arietis Observed Photographically—
By Edward C. Pickering 133

Occulting Bodies, Light Curves of—
Letter on; by C. H. Rockwell 254

Ocean, The Mimic Fires of—
By G. Clarke Nuttall 150

XUM

PAGE

Old-World Highland, An—
By Grenville A. J. Cole 170

Ornithological Notes, British—
Albino Varieties of Mistle Thrush, Common Snipe, Woodcock, and Curlew—E. Williams 112
Avocet in Dublin Bay—E. Williams 112
Bittern, Little, in County Cork—John J. Wolfe ... 66
Bustard, Great, A Norfolk—Thomas Southwell ... 14
Bustard, Little, in Norfolk—E. A. Butler ... 66
Buzzard, Rough-legged, in Co. Down—R. Patterson 177
Capercailie and the Pheasant, on Hybrids between—W. Eagle Clarke 36
Crake, Baillon's, in Caithness—W. Arkwright ... 255
Crane in County Tipperary—W. Johnston ... 66
Crows, Carrion, capturing a Lark—John Cordeaux 81
Dipper, Common, at Hillington—Sir W. H. B. Ffolkes 277
Dove, Ring-, nesting in Edinburgh—A. Craig ... 177
Duck, Ferruginous in West Meath—H. F. W. ... 14
Duck, Long-tailed, in Holderness—John Cordeaux 80
Duck, Long-tailed in Ireland—Robert Warren ... 177
Flycatcher, Pied, in Caithness—James Sutherland .. 177
Flycatcher, Pied, in Shetland—W. E. Clarke ... 177
Garefowl, The Orcadian home of the—Alfred Newton 255
Guillemot, Variety of the Common—J. Morley ... 15
Gull, Glaucous, in Isle of Man—P. Ralfe ... 81
Gull, Iceland, in County Sligo in Summer—Robert Warren 203
Gull, Mediterranean Herring, A New British Gull—Thomas Southwell 14
Gull, Sabine's, in Arran—John Paterson ... 36
Gulls, Lesser Black-backed, on the Exe—W. S. M. D'Urban 203
Harrier, Marsh, in Dumfrieshire—R. Service ... 177
Harrier, Montagu's, breeding in Ireland (*correction*) John H. Teesdale 36
Hawfinch in Co. Down—R. Patterson 177
Hawfinch in Midlothian—W. E. Clarke 177
Hoopoe in Sussex—Emma L. Turner 36
Jackdaws having Domed Nests—W. Wells Bladen 15
Jackdaw's Nest, Curious—S. L. Mosley 66
Migrants, Spring, Late Arrival of, near Exeter—W. S. M. D'Urban 202
Moorhen chasing Stoat—B. W. Martin 234
Nesting, Early, of Birds 36
Nesting, Early, of Starling, Long-tailed Tit and House Sparrow 66
Nesting Sites, Change of, of Common Tern and Ringed Plover—W. Serle 234
Ortolan in Shetland—W. E. Clarke 177
Partridge, The Memory of the—J. F. Green ... 255
Parus salicarius, "A hitherto overlooked British bird"—Ernst Hartert 81
Pastor, Rose-coloured, in West Ross-shire—J. A. Fowler 36
Peregrines and Herring Gulls—C. J. Wilson ... 203
Phalarope, Grey, in Co. Antrim—R. Patterson ... 177
Phalarope, Grey, near Kilkenny—G. E. H. Barrett-Hamilton 81
Pintail, On the Nesting of the, in the Forth Area—W. Evans 177
Pipit, Water, in Carnarvonshire—G. H. Caton Haigh 112
Pochard, Red-crested, in Westmoreland—H. A. Macpherson 36
Protection of Birds in Scotland—M. L. Lemon ... 177

PAGE

Puffinus assimilis and *P. obscurus* 162
Quail in Sussex—Edwin A. Pratt 66
Redwing, Song of—C. A. Witchell 81
Robins and Honeysuckle—C. A. Witchell ... 255
Rockall, Notes on an Expedition to—R. Lloyd Praeger 15
Sandpiper, Pectoral, in Kent.—N. F. Ticehurst ... 277
Sandpiper, Pectoral, in Norfolk—J. L. Newman ... 36
Sheerwater, The Great, at St. Kilda—Henry Evans 255
Shrike, Red-backed, in Caithness—James Sutherland 177
Sparrows, House, and Pigeons—F. G. Aflalo ... 15
Squirrels and Birds—C. M. Battersby 234
Swallow, Early Arrival of—E. Sillence 162
Swans, Bewick's, in Suffolk—J. F. Green ... 277
Thrush, Hybrid, found in Norway—R. Collett ... 203
Thrush, Mistle, swallowing Droppings of Young—Harry F. Witherby... 66
Thrush, Mistle, Variation in the Song of—C. A. Witchell 81
Thrush, White's, in Warwickshire—Peter Spicer ... 277
Tits, Marsh, and Honeysuckle—Mary L. Armitt ... 80
Wagtail, White, in County Mayo—Robert Warren 162
Wagtails, Migrating, at Peterhead—W. Serle ... 234
Warbler, Barred, in Lincolnshire—G. H. Caton Haigh 277
Warblers, Melodious, in South-East Devon—Murray R. Mathew 177
Waxwings at Scarborough—J. Morley 15
Whinchat in Shetland—W. E. Clarke 177
Wigeon Nesting in Yorkshire—W. J. Clarke ... 26
Wigeon, Unusually large Numbers of, in Belfast Lough—R. Lloyd Patterson 80
Woodchat in Sussex—G. W. Bradshaw 177

Oswald, Felix, B.A., B.Sc.—
The Affinities of Flowers 222

Parker, Prof. T. Jeffrey—
Obituary Notice of 67

Parr, W. Alfred—
Letter on Evolution in Bird-Song 277

Patents, Number of Applications for—
Note on 63

Paxton, L.—
Letter on Is Weather affected by the Moon? 33
Moon in Eclipse, January 7th, 1898... ... 40

Petroleum Industry, The—
By George T. Holloway ... 124, 151, 169

Pickering, Edward C.—
Stars having large Proper Motion 89
Occultation of 26 Arietis observed Photographically 133
A Variable Bright Hydrogen Line 134
A New Spectroscopic Binary 134
Photographic Spectrum of the Aurora ... 134
Variable Stars of Short Period 205

Planet D Q, The New—
By A. C. D. Crommelin 250

Plants, Self-Irrigation in—
By Rev. Alex. S. Wilson ... 160, 173, 245

PAGE

Playfair, The Lord—
Obituary Notice of 158

"Quagga," The—
Letter on; by H. W. M. Lagerwey 203

Quick, James—
Progress in Radiography 247

Radiography, Progress in—
By James Quick 247

Reversing Layer, The Objective Prism, the Flash, and the—
By E. Walter Maunder 184

Roberts, Isaac, D.Sc., F.R.S.—
Photograph of the Spiral Nebula Messier 33 Trianguli 39
Nebula and Region round γ Cassiopeiæ ... 106
Photograph of the Nebulous Region round H V 37 Cygni 253

Rockwell, Chas. H.—
Letter on Light Curves of Occulting Bodies 254

Sadler, Herbert, F.R.A.S.—
The Face of the Sky 23, 47, 71, 95, 119, 143
Obituary Notice of 158

Salvin, Osbert, F.R.S.—
Obituary Notice of 158

São Nicolau, Cape Verde Islands, A Valley on—
By Boyd Alexander 100

Saxby, Fred W.—
How to Photograph through a Fly's Eye ... 187

Science Notes 15, 37, 63, 112, 136, 159, 204, 230, 254, 275

Scientific Societies, South-Eastern Union of—
Note on 159

Sea-Otter, and its Extermination, The—
By R. Lydekker 78

Sea-Squirt, The—
By E. Stenhouse 220

Serpents and How to Recognize Them—
By Lionel Jervis 7

Shackleton, Wm. F.R.A.S.—
The Prismatic Camera during Total Eclipses 9
Cloud Belts 56
Letter on The Level of Sunspots 112

Shakespeare's Greenwood, Christmas Customs of—
By George Morley 268

Sidgreaves, Walter S. J.—
Letter on Spectrum of ♉ Ceti 61

PAGE

Sky, The Face of the—
By Herbert Sadler ... 23, 47, 71, 95, 119, 143
By A. Fowler ... 167, 191, 214, 238, 263, 286

Sokotra, Expedition to—
Note on 275

Space, Movement in—
Letter on; by Ignoramus 18

Spectra of Bright Stars, The—
By E. Walter Maunder 40

Spectra of ♉ Ceti and ♐ Herculis, Photographed—
By E. Walter Maunder 113

Spectra, Prismatic, in Terms of Wave-Lengths—
Note on 160

Spectrum of ♉ Ceti—
Letter on; by Walter Sidgreaves 61

Spider, The British Trap-door—
Letter on; by H. G. Jeffery 35

Stars having Large Proper Motion—
By E. C. Pickering 89

Stars, Masses and Distances of Binary—
By J. E. Gore 62
Letter on; by Edwin Holmes 136

Stars, On the Eclipse Theory of Variable—
By Lieut-Col. E. E. Markwick 158
Letter on; by W. H. S. Monck 182
Letter on; by Harold Whichello 183
Letter on; by E. E. Markwick 253

Stars, Variable—
Letter on; by David Flanery 60
Letter on; by David Flanery 81
Letter on; by W. E. Besley 81
Letter on; by W. H. S. Monck 279

Stars, Variable, in Clusters 281

Stars, Variable, in Globular Clusters—
By Miss Agnes M. Clerke 279

Stars, Variable, of Short Period—
By Edward C. Pickering 205

Stebbing, Rev. Thomas R. R., M.A., F.R.S., F.L.S.—
The Karkinokosm, or World of Crustacea 1, 67, 104, 145, 197, 243

Stein, Sigmund—
Letter on Sugar-Beet Industry in England 277

Stenhouse, E., A.R.C.S., B.Sc.—
The Sea-Squirt 220

PAGE

Sternwarte, The Urania—
Letter on; by Ivo F. H. Carr-Gregg ... 35

Stretton, G. Northover—
Letter on A Brilliant Meteor... 114

Sun's Stellar Magnitude, The—
Letter on; by W. H. S. Monck 159
Letter on; by J. E. Gore 159
Letter on; by William Shackleton... ... 112

Sunspot, The Great—
Letter on; by Maxwell Hall 279

Sunspot, The Great, and the Aurora—
By E. W. Maunder 228

Sunspots—
Letter on; by J. H. Jenkinson 181

Sunspots, A Theory of Refraction in—
Letter on; by Arthur East 204

Sunspots and Life—
By Alex. B. MacDowall 234

Sunspots, Artificial—
Letter on; by Thos. J. Haddy 17

Sunspots, The Level of—
By Rev. Arthur East... 89

Superstition, An Irish—
By Frances I. Battersby 256

Tetley, William C.—
Letter on Weasel and Young 278

Townsend, C. F., F.C.S.—
Liquid Fluorine 31

Universe, Richard Proctor's Theory of the—
By C. Easton 12

U Orionis and S and U Coronæ—
Letter on; by David Flanery 203

Venom-Fang, The Evolution of the—
By Lionel Jervis 91

Vinegar Eel, The—
By C. Ainsworth Mitchell 53

PAGE

Vinegar Fly, The, and the Vinegar Mite—
By C. Ainsworth Mitchell 139

Volcanoes of the North—
By Grenville A. J. Cole 266

Ward, H. Snowden, F.R.P.S.—
Nature's Finer Forces 114

Weather Accounts—
By Alex. B. MacDowall 128

Weather, Is, affected by the Moon?—
By Alex. B. MacDowall 5
Letters on; by L. Paxton and G. E. E. ... 33

Weasel and Young—
Letter on; by C. A. Witchell 254
Letter on; by J. F. Green 278
Letter on; by W. C. Tetley 278

Wesche, Walter—
Letter on Hooked Process of Bees' Mandibles 183
The Hooks on the Mandible of the Honey Bee and the Gizzard of the Ant 259

Whale Models at the Natural History Museum—
By R. Lydekker 198

Wheat and the Laboratory—
Note on 230

Whichello, Harold—
Letter on the Eclipse Theory of Variable Stars 183

Whitteron, Fred—
Letter on Vegetation of Australasia 33

Wilson, Rev. Alex. S., M.A., B.Sc.—
Self-Irrigation in Plants ... 160, 173, 245

Winnecke, Dr. F. A. T.—
Obituary Notice of 21

Witchell, Charles A.—
Repetition and Evolution in Bird-Song ... 196
Letter on Weasel and Young... 254

Witherby, Harry F., F.Z.S., M.B.O.U.—
From a Hole in the Mudflats... 29

Wright, S. H.—
Letter on Liquid Fluorine 61

Zoology, The Fourth International Congress of 226

INDEX OF THE PRINCIPAL ILLUSTRATIONS.

PAGE

Abel Tester for the "Flash Point," The 170

Ant, Gizzard of (*Lasius niger*) ... 259

Antlers, Ancient Red Deer—
- Skull and Antlers of Aged Scotch Red Deer 43
- Antlers of Red Deer from an Irish Bog 43
- Antlers of Ancient German Red Deer 44
- Antlers of German Red Deer with Twenty Points 44
- Antlers of Ancient German Red Deer with Twenty-two Points ... 45
- Antlers of French Red Deer with duplication on the right side ... 45

Arietis (26), Occultation of 133

Audubon 231

Bee, Hooks on the Mandible of the Honey (*Apis mellifica*) 259

Bees, British—
- *Colletes Daviesana* 51
- *Andrena fulva*; *Cilissa hæmorrhoidalis*; *Dasypoda hirtipes* ... 52
- *Nomada succincta* 53
- Rose leaves cut by *Megachile* ... 82
- The Leaf-cutter Bee 82
- Under side and side view of Abdomen 82
- Head of Leaf-cutter Bee 83
- Tunnel of Leaf-cutter Bee ... 83
- Third pair of Legs, open and shut 83
- Leaf-cutter Bee at work ... 84, 97
- Tunnel of Leaf-cutter Bee—
  - Foundation of first cell ... 97
  - First side-piece cut and carried, and fixed in position 97
  - Second, third, and fourth side-piece 98
  - First gap filled up 98
  - Section of first cell, showing pudding and egg 98
  - Three cells 98
  - Section of cells and puddings ... 99
  - Larvæ feeding 99
  - Pupæ 99
  - Five cells, two of them vacated 99

Bladder of Bladderwort 223

Bladderwort Plant in flower ... 222

Botanical Studies—
- Vaucheria aversa 22
- Coleochæte 55
- Jungermannia 117
- Mnium 165
- Asplenium 212
- Selaginella 261
- Abies 283
- Lilium 284

Bushman 224

Calamocichla brevipennis, Nest of, in a Coffee Tree 101

Camera, Prismatic, used in Brazil ... 9

PAGE

Campbell's (Professor) Observing Station at Jeur, India 156

Cloud-Belt, The Equatorial 56

Colours of Cowries, The (full page photographic plate) 272

Crustacea, The World of—
- A Phyllopod of Palestine (*Estheria gihoni*) 1
- A pedunculated Cirripede (*Lepas anatifera*) 2
- A Copepod, parasitic on fish (*Lernæolophus sultana*) 2
- A West Indian Land Crab (*Cardisoma guanhumi*) 3
- An Arctic Isopod (*Glyptonotus sabini*) 3
- *Hemimerus talpoides*; *Dipeltis carri* (from Schuchert); *Dipeltis diplodiscus* 67
- *Cryptolithodes typicus* 68
- Swimming foot of Amphipod ... 69
- Deep-sea Shrimp taken by the *Albatross*. Life-size 104
- Last uropod of the Urothoe ... 105
- *Urothoe brevicornis* 105
- Second antenna of *Haustorius arenarius* 105
- *Platyarthrus Hoffmannseggii* ... 106
- *Nebalia bipes* (O. Fabricius) ... 146
- *Lepidurus arcticus* (Pallas) ... 146
- *Daphnia carinata* 147
- *Cyclops Serrulatus* Fischer, Figure of 198
- *Copilia vitrea* (Haeckel) 198
- *Calocalanus Plumulosus* (Claus)... 198
- *Notopterophorus papilio* Hesse, Figure of 199
- *Sphyrion lævigatum* (Quay and Gaimard). M.A.S. 243
- *Notodelphys agilis*, Thorell. From Brady 243
- *Lomanoticola insolens*. From A. Scott 244
- *Nicothoë astaci*, Milne-Edwards and Audouin 244
- *Sphæronella elegantula*, Hansen... 244
- *Caligus torpedinis*. *Chondracanthus horridus*. From Heller ... 245
- *Diocus gobianus* (Fabricius). From Steenstrup and Lütken ... 245

Eclipse Spectra (full page photographic plate) 132

Eel, The Vinegar (after Pasteur) ... 53

Esker at Balrothery, View from the road along the 218

Esker at Green Hills, co. Dublin, Section in the 219

Esker at Green Hills, co. Dublin, Stratification of sand at base of the 220

Esker at Tymon Castle, The south-west slope of the 219

Faculæ, Artificial and Natural ... 183

PAGE

Fluorine, Apparatus for Liquefaction of 32

Fly's Eye, How to photograph through a 188, 189

Gneiss, Block of, from co. Mayo, Ireland 26

Godwit, The Bar-tailed 30

Guillemots on Cliff 19

Gulls, Lesser Black-backed 18

Holly Fly, Parasite of 210

Holly Leaf mined by Larva of *Phytomyza aquifolii* 210

Ireland, The Structure of—
- Sketch-map of Ireland 76
- Section on the east border of co. Cork 77
- Slievenaman (2364 feet), co. Tipperary 77

Killary Harbour, View of the head of the fjord of 171

Leo, the Constellation, with Stellar Standards of Reference 252

Light Curves as observed with the Photometer 155

Light Curves (Theoretical) of different Binary systems 154

Lunar Alps and their neighbourhood, The 85

Marguerite Fly, The—
- Ovipositing in Leaf 178
- Sealing up the Egg; larva and pupa of; Egg, part of mine, and parasite of; continuation of mine and pupa, in which parasite is ovipositing 179

Marguerite, Golden, affected with "the maggot"; Leaves of, showing Larvæ 178

Milky Way, The, according to Celoria 13

Milky Way, The, according to Proctor 12

Moon in Eclipse, January 7th, 1898, Photograph of 40

Moon, Path of, through the Earth's shadow, December 27, 1898 ... 287

Moon, The Rising and Setting of the Harvest 215

Mourne Granite, Specimen of ... 123

Mourne Mountains, View in the valley of the Kilkeel River, ... 122

Mudflats, Low Tide on the 29

PAGE

Oilfield of Bradford, Derricks in the 125

Oil Refinery at Philadelphia ... 152

Oil Well after being Torpedoed ... 126

Orbits of Mars, DQ, and the Earth, Relative Disposition of the ... 251

Papuan Girl, Head of 226

Peas grown in Experiments on the Fixation of Free Nitrogen ... 149

Plants, Self-irrigation in—

Centrifugal and Centripetal Irrigation 161
Nodding and Auriculate Leaves 161
Rain-conducting Channels ... 162
Leaf-cups of Teasel 173
Irrigation of the Chick-weed; transverse section of Chickweed stem; vertical section of Chickweed stem 174
Rotifer inhabiting the hood of a Scale-Moss 246
Animals inhabiting the axils of leaves 246

Quarry at Whitehead, Belfast Lough 267

Rainfall, Curves of 130

Raspberry Shoot affected with "the maggot" of *Lampronia rubiella* ... 210

PAGE

Raspberry Shoot, showing Larva of *Lampronia rubiella* 211

"Reversing Layer," Photograph of the 10

Roberts, Dr. Isaac, Full page photographic Plates by—

Spiral Nebula Messier 33 Trianguli 39
Nebulæ near γ Cassiopeiæ ... 106
Nebula μ V 37 Cygni 253

Rocks, Ridge of Ancient, seen from Church Stretton, Shropshire ... 27

Sea Otter, Upper and Lower Teeth of the 79

Solar Corona, The, 1898, January 22 156

Spectra, Comparative Scale for Reduction of 160

Spectra of o Ceti (1897, December), and α Herculis (1898, February), Photographed at Stonyhurst College Observatory 113

Spectrum of an Eclipse, The ... 185

Spectrum of o Ceti 61

Sun's Corona, The Total Eclipse of, January 22, 1898 ... 50, 108, 109

Sunspot, Ideal Vertical Section of a 113

PAGE

Sunspots, A Group of 181, 182

Sunspots and Life (Diagram of Curves) 235

Sunspots, The Great Group of (September 3-15, 1898) 228

Sunspots, The Level of—

Symmetrical Spot, Elevated Penumbra 89
Symmetrical Spot, Penumbra with Dark Margin 89
Unsymmetrical Spot, Penumbra wanting on one side 90
Spot without Penumbra 90
Sunspots 90
Empty Vessel, with black bottom just in view; the same filled with water; the same viewed very obliquely 90, 91

Tasmanian Woman 225

Temperature, Curve of Annual ... 129

Temperature, Curve of Daily ... 129

Venom-Fang, Evolution of the 92, 93

Vinegar Mite, The 140

Whale Gallery at the Natural History Museum, View in the ... 195

Wigeon's Nest and Eggs 36